A new species of *Coecobrya* (Entomobryidae: Collembola) from Dongtou Island, Zhejiang Province

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Abstract: A blind new species of springtail, *Coecobrya islandica* Shi & Pan sp. nov., is described from Dongtou Island. It is identified by eyes absent, "smooth" chaetae present on manubrium and absent on inner tibiotarsus, labial chaetae $MREL_1L_2$ smooth, spiny mic X and X_4 present, clypeal chaetae, sens on Abd. II–IV and dorsal chaetotaxy of Th. II–Abd. V, and is most similar to *Coecobrya brevis* Xu *et al.*, 2012. Illustrations and detailed differences between similar species are provided here.

Key words: Entomobymorpha; springtail; eyeless; chaetotaxy; taxonomy

浙江省洞头拟裸长角蛛属一新种（长角蛛科：弹尾纲）

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摘要：记述浙江省洞头岛拟裸长角蛛属 1 无眼新种，岛屿拟裸长角蛛*Coecobrya islandica* Shi & Pan sp. nov.。此新种的鉴定特征为无眼，弹器基具"光滑"刚毛，胫肘节内侧无"光滑"刚毛，下唇 $MREL_1L_2$ 为光滑刚毛，X 和 X_4 为光滑刺状小刚毛，上唇基刚毛，腹部第 II–IV 节的感觉毛以及背部毛序。该新种与短毛拟裸长角蛛*Coecobrya brevis* Xu *et al.*, 2012 最相似。本文给出了该新种的特征图及与相似种的详细特征比较。模式标本保存于台州学院生命科学学院和南京农业大学植保学院昆虫系。

关键词：长角蛛目；蛛虫；无眼；毛序；分类

Introduction

Coecobrya was established by Yosii (1956) as a subgenus of *Sinella* Brook, 1882, based on *Sinella* (*Coecobrya*) *akiyoshiana* Yosii, 1956 from Japan. *Coecobrya* was raised to the generic-level by Deharveng (1990) and Zhang *et al.* (2009). This genus is discriminated by absence of labral papillae, antennal apical bulb, scales and dental spines, reduced eye number (usually as 0–3 on each side), pigment reduced or absent, falcate mucro (Chen & Christansen 1997; Zhang *et al*. 2009). Two groups (*tenebricosa*- and *boneti*-) were proposed by Zhang *et al.* (2011a), blind and with a large outer tooth on unguiculus in the former and eyed and with the outer edge smooth or serrate in the latter. Chinese Collembologists Jianxiu CHEN and Feng ZHANG made significant contributions to the taxonomy of this genus (Chen & Christiansen 1997; Zhang *et al.* 2009, 2010, 2011a, 2014; Zhang & Dong 2014; Xu *et al.* 2012). So far, 47 species have been recorded worldwide, but only 12 of them recorded from China (two 3+3

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eyed and the others blind) (Zhang & Dong 2014; Zhang *et al.* 2014; Bellinger *et al.* 1996–2014).

Dongtou Island, located in the eastern Wenzhou City, Zhejiang Province, and about 30 kilometers away from the mainland, belongs to subtropical monsoon climate. Specific studies on Collembola have not been implemented previously on this Island. This is the first recorded, illustrations of the new species and detailed differences between similar species are listed.

Material and methods

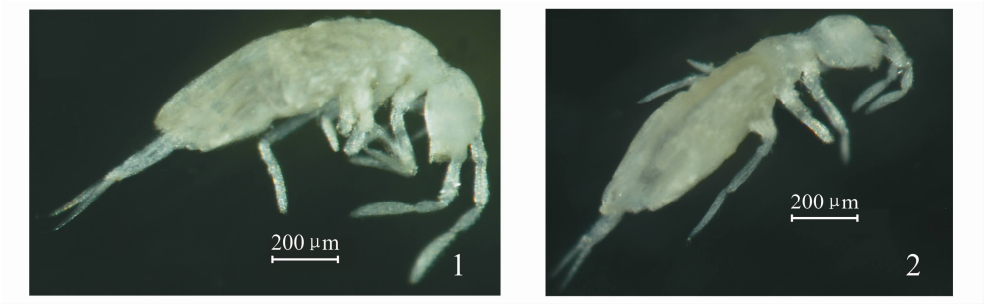
Specimens were deposited in 99% ethanol and under -20 degree Celsius conditions, cleared in Nesbitt's fluid, mounted under a coverslip in Marc André II solution, and checked using a Nikon 80i microscope with phase contrast. Photographs were taken under a Nikon SMZ1000 stereomicroscope mounted with a Nikon DS-Fi1 camera. Illustrations were strengthened and labeled using Photoshop CS2 (Adobe Inc.). All length data were measured employing NIS-Elements Documentation 3.1 software (Nikon). Dorsal and ventral cephalic chaetotaxy is designated following Chen & Christiansen's system (1993), dorsal chaetotaxy of terga follow Szeptycki (1979) and Zhang *et al.* (2011b).

Abbreviations. Ant. — antennal segment; Th. — thoracic segment; Abd. — abdominal segment; ms — specialized microchaeta(e); sens — specialized ordinary chaeta(e); mac — macrochaeta(e); mic — microchaeta(e); Gr. — group; p — pseudopore(s).

Taxonomy

***Coecobrya islandica* sp. nov.** (Figs. 1–24)

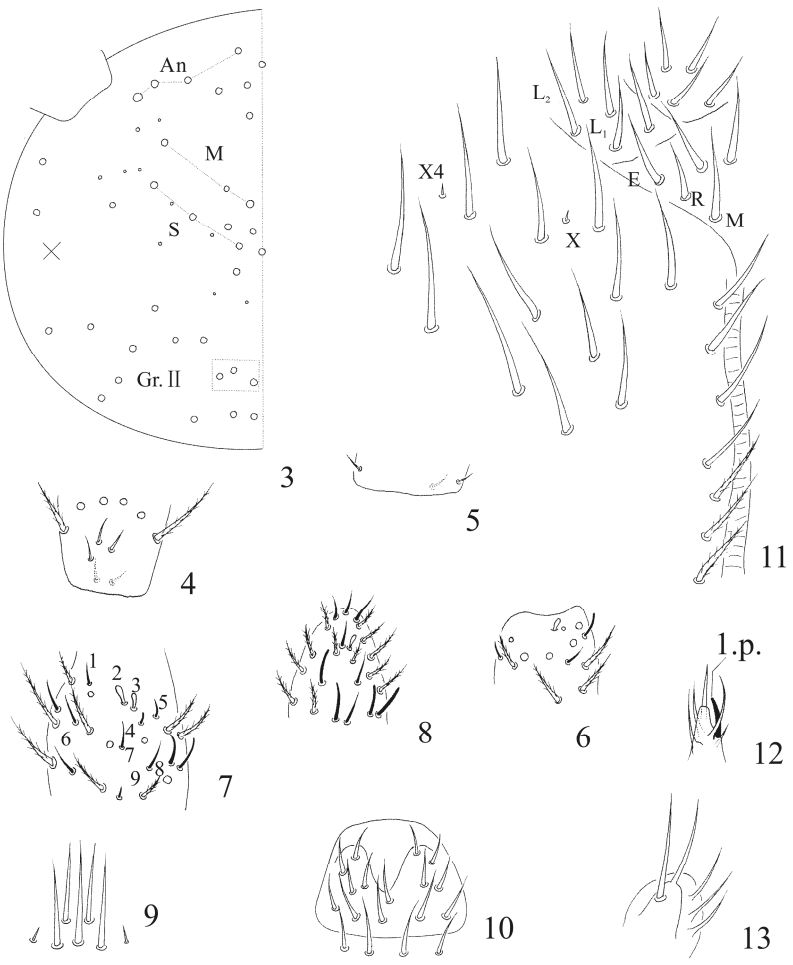
Body length up to 1.42 mm. Body white (Figs. 1, 2).



Figures 1, 2. *C. islandica* sp. nov. 1. Habitus, lateral view; 2. Habitus, dorsal view.

Head. Antenna 1.16–1.34 times as long as cephalic diagonal. Antennal segments ratio as I : II : III : IV = 1 : 1.76–2.08 : 1.24–1.70 : 2.76–3.37. Smooth spiny mic at basal antennae: 3 dorsal, 2 ventral on Ant. I (Fig. 4), 1 internal, 1 external and 1 ventral on Ant. II (Fig. 5). Distal Ant. II ventral with 1 slightly expanded sens (Fig. 6). Two internal sens of Ant. III organ slightly expanded (Fig. 7). Ant. IV without apical bulb, subapical organite expanded (Fig. 8). Dorsal cephalic chaetotaxy with 4 antennal (An), 3 median (M), 3 sutural (S) and 3 mac in Gr. II; eyes absent (Fig. 3). Clypeus with 5 smooth large chaetae arranged in 2 lines (2/3 respectively) and

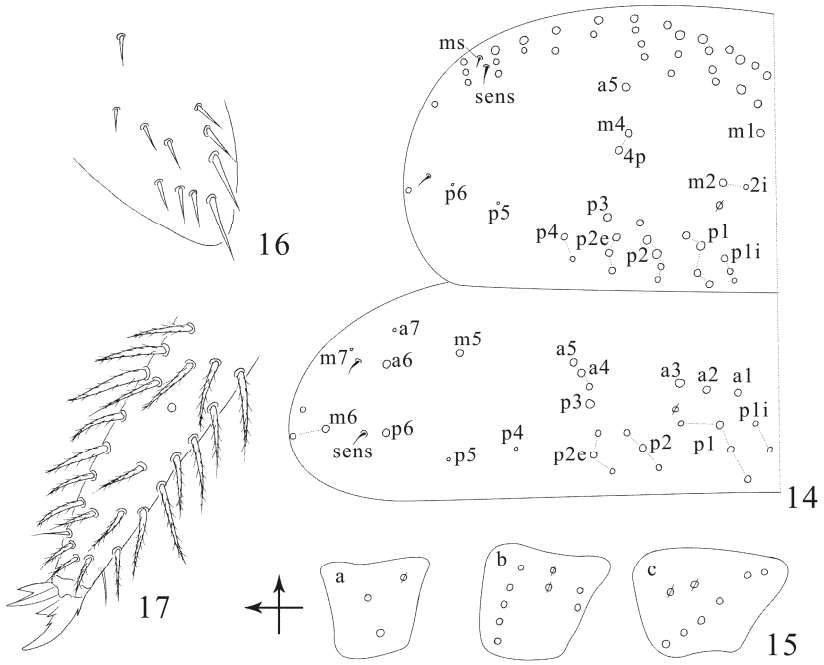
2 tiny smooth mic laterally (Fig. 9). Prelabral and labral chaetae 4/5, 5, 4, all smooth, intrusion on labrum U-shaped (Fig. 10). Labial chaetae as $MREL_1L_2$, all smooth, R shorter than M; chaetae X and X_4 as tiny smooth mic, X_2 and X_3 absent. Cephalic groove with 6–7 chaetae, anterior 4 smooth (Fig. 11). Papilla E with 4 guard chaetae; lateral process (l.p.) of labial palp slightly thicker than normal chaetae, with tip beyond apex of labial papilla E (Fig. 12). Subapical chaeta of maxillary outer lobe slightly longer than apical one; 3 smooth sublobal hairs on subplate of maxillary outer lobe (Fig. 13).



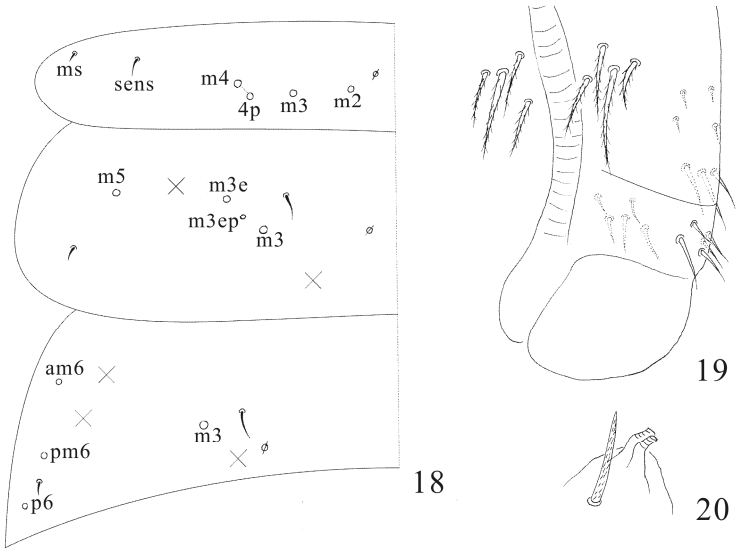
Figures 3–13. *C. islandica* sp. nov. 3. Dorsal cephalic chaetotaxy; 4. Basal Ant. I; 5. Basal Ant. II; 6. Distal Ant. II; 7. Distal Ant. III; 8. Apical Ant. IV; 9. Clypeal chaetae; 10. Labral chaetotaxy; 11. Chaetae on the ventral side of head; 12. Labial papilla E; 13. Maxillary outer lobe.

Thorax. Th. II with 3 medio-medial (m1, m2, m2i), 2 medio-lateral (m4, m4p), 16–18 posterior mac and 3 lateral S-chaetae (ms antero-external to sens); p5 and p6 as mic. Th. III with 20–24 mac and 2 lateral sens; p4 and p5 as mic, p6 as mac (Fig. 14). Coxal macrochaetal formula as 2 (1 p)/4+1, 2 (2 p)/4+2 (2 p) (1/2/2 p on fore/mid/hind coxa, respectively) (Fig. 15). Trochanteral organ with 10–11 smooth spiny chaetae; 6–8 in arms and 2–4 between them

(Fig. 16). Inner tibiotarsus without "smooth" chaetae. Unguis with 3 inner teeth; 2 paired teeth unequal, outer one larger and 1 unpaired tooth. Unguiculus outer edge with a large tooth. Tenent hair I–III pointed, shorter than unguiculus in length (Fig. 17).



Figures 14–17. *C. islandica* sp. nov. 14. Dorsal chaetotaxy of Th. II–III; 15. Coxal macrochaetal formula (a. Fore leg; b. Mid leg; c. Hind leg); 16. Trochanteral organ; 17. Distal tibiotarsus and claw of hind leg.

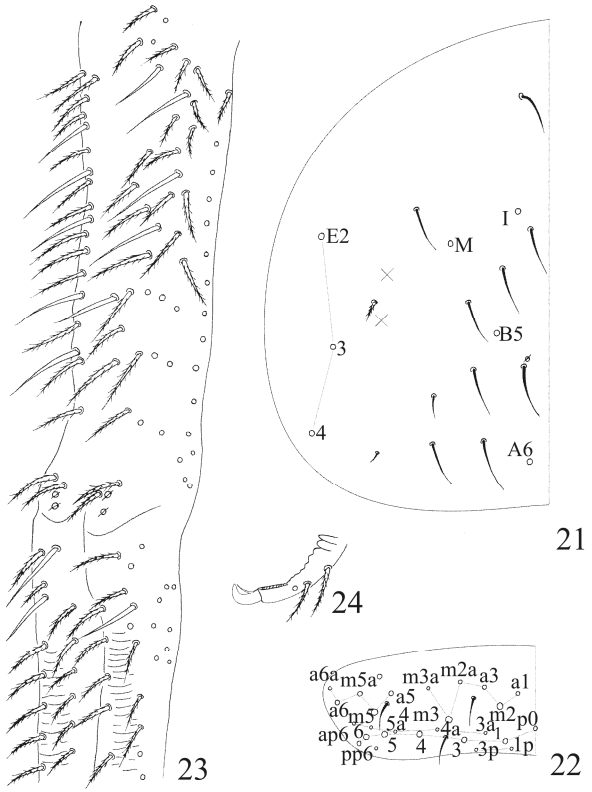


Figures 18–20. *C. islandica* sp. nov. 18. Dorsal cheatotaxy of Abd. I–III; 19. Ventral tube; 20. Tenaculum.

Abdomen. Abd. IV about 2.5 times as Abd. III in length along dorsal midline. Abd. I with 4 (m2–4 and m4p) mac and 2 S-chaetae (ms external to sens). Abd. II with 3 (m3, m3e, m3ep) central, 1 (m5) lateral mac and 2 sens. Abd. III with 1 (m3) central, 3 (am6, pm6, p6) lateral mac and 2 sens. Lateral sens on Abd. II–III as half of central one in length (Fig. 18). Abd. IV with 4 (I, M, A6, B5) central, 3 (E2–4) lateral mac and at least 11 (9 elongate and 2 normal) sens (Fig. 21). Abd. V with 3 sens (middle one posterior to m3) (Fig. 22). Ventral tube with 4+4 ciliate chaetae on anterior face; 7–9 posterior smooth chaetae (4–5 as tiny); 5–7 smooth chaetae on each lateral flap (Fig. 19). Tenaculum with 4+4 teeth and one large striate chaeta (Fig. 20). Furcula laterally with smooth chaetae, 2 of them on base of dentes and others on manubrium. Manubrial plaque with 2 p and 2 ciliate chaetae (Fig. 23). Mucro with tip of basal spin reaching apical tooth, distal smooth part of dentes subequal to mucro in length (Fig. 24).

Ecology. Under the leaf litter of *Ligustrum lucidum* and *Pteridium aquilinum* on a rainy day, altitude 35±4 m.

Holotype. ♀ on slide, **China**, Zhejiang, Wenzhou City, Dongtou Island, 27°50′51″N 121°09′34″E, 30-V-2012, collected by Zhixiang PAN, sample number as S4292. **Paratypes.** 3♀ on slides and 3 specimens in ethanol, same data as holotype. One paratype on slide deposited in the Department of Entomology, College of Plant Protection, Nanjing Agricultural University and others in the School of Life Sciences, Taizhou University.



Figures 21–24. *C. islandica* sp. nov. 21. Dorsal chaetotaxy of Abd. IV; 22. Dorsal chaetotaxy of Abd. V; 23. Manubrium and basal dentes; 24. Distal dentes and mucro.

Etymology. This species epithet is named for being the first recorded from an island (Latin "islandica").

Remarks. This new species, belonging to the *tenebricosa*-group, is characterized by white habitus, "smooth" chaetae present on manubrium and absent on inner tibiotarsus, labial chaetae $MREL_1L_2$ smooth, spiny mic X and X_4 present, 5 normal and 2 tiny smooth clypeal chaetae, lateral sens on Abd. II–III half of central one in length, Abd. IV with elongate sens, and dorsal chaetotaxy of Th. II–Abd. V.

It is most similar to *C. brevis* in habitus, eyes absent, clypeal chaetae, labial chaetae, sens on lateral Abd. II–III, chaetotaxy of dorsal head and Abd. I–III, and structure of furcula. However, it can be easily distinguished from latter by X_2 on labium, sens on dorsal Abd. IV, chaetotaxy of Th. II–III and Abd. IV, ciliate chaetae on anterior face of ventral tube and "smooth" chaetae on inner tibiotarsus. Also, it is similar to *C. pani* Xu *et al*., 2012 in habitus, ventral cephalic chaetotaxy, chaetotaxy of Abd. II–IV and structure of tibiotarsus and furcula. Detailed differences between them are listed in Table 1.

Table 1. Detail differences between *C. islandica* sp. nov. and similar species of *Coecobrya*

Characters	*C. islandica* sp. nov.	*C. brevis*	*C. pani*
Maximum body length (mm)	1.42	1.44	2.32
Tiny smooth mic X_2 on labial base	Absent	Present	Absent
Long smooth chaetae of clypeus	5	5	11
Chaetotaxy of Th. II			
m2 and m2i	Mac	Mic	Mac
p4 and p4i	Mac	Mic	Mac
relative position of ms to sens	Antero-external	Antero-external	External
"Smooth" chaetae on inner tibiotarsus	Absent	Present	Absent
Chaeta m2i on Abd. I	Mic	Mic	Mac
Length ratio of lateral sens versus central one on Abd. II–III	About 1/2	About 1/2	About 1
Elongate sens on middle Abd. IV	Present	Absent	Present
Ventral tube			
ciliate chaetae on anterior face	4	7 (8)	5
tiny smooth chaetae on posterior face	4–5	4	0

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